



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1133GA-JM BYPASS RATIO (-): 11.6  
 UNIQUE ID NUMBER: 01P22PW166 PRESSURE RATIO  $\pi_{co}$  (-): 38.1  
 COMBUSTOR: TALON X, Block-D  
 ENGINE TYPE: TF RATED OUTPUT  $F_{co}$  (kN): 147.3

### REGULATORY DATA

CHARACTERISTIC VALUES:	$LTO_{mass}/F_{co}$ (mg/kN)	$LTO_{num}/F_{co}$ (particles/kN)	NVPM MASS CONCENTRATION ( $\mu\text{g}/\text{m}^3$ )
LTO/ $F_{co}$ AND MAX nvPM <sub>mass</sub>	52.3	1.05E+15	1443
AS % OF CAEP/10 LIMIT	-	-	26.3
AS % OF CAEP/11 LIMIT (InP)	3.5	10.3	
AS % OF CAEP/11 LIMIT (NT)	22.5	34.8	

### MEASURED DATA

MODE	POWER SETTING (% $F_{co}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM <sub>mass</sub> ( $\mu\text{g}/\text{m}^3$ )
				EI <sub>mass</sub> (mg/kg)	EI <sub>num</sub> (particles/kg)	
TAKE-OFF	100	0.7	1.023	37.7	3.12E+14	
CLIMB OUT	85	2.2	0.839	31.4	4.01E+14	
APPROACH	30	4.0	0.278	0.4	4.07E+13	
IDLE	7	26.0	0.099	2.7	3.25E+14	
LTO TOTAL (kg, mg, number of particles)			375	5539	1.11E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				4	4	4
AVERAGE LTO/ $F_{co}$ VALUES (mg/kN, particles/kN)				37.6	7.52E+14	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				37.7	4.25E+14	1121

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% $F_{co}$ )	CORRECTED EMISSIONS INDICES	
		EI <sub>mass_SL</sub> (mg/kg)	EI <sub>num_SL</sub> (particles/kg)
TAKE-OFF	100	44.9	8.72E+14
CLIMB OUT	85	38.7	1.38E+15
APPROACH	30	0.9	4.30E+14
IDLE	7	6.0	4.51E+15

### AMBIENT CONDITIONS

	From		To		FUEL			
	BAROMETER (kPa)	TEMPERATURE (K)	HUMIDITY (kg water/kg dry air)	HEAT OF COMBUSTION (MJ/kg)			HYDROGEN CONTENT (%mass)	AROMATICS CONTENT (%vol)
	101.5	279.6	0.0036	102.2		43.32		
				300.8		13.89		
						16.5		
						0.74		
						228		

MANUFACTURER: Pratt & Whitney  
 TEST ORGANIZATION: Pratt & Whitney  
 TEST LOCATION: W. Palm Beach, FL  
 TEST DATES: 18/01/2020-21/01/2020

### REMARKS

1. Data from certification report PWA-12090
2. 1 engine tested
3. TALON-X, Block-D combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 4.